

METAL PROGRESS

Volume 54; July 1948 to December 1948

Ernest E. Thum
Editor

William H. Eisenman
Business Manager

Metal Progress Is Owned, Published and Copyrighted by

THE AMERICAN SOCIETY FOR METALS

7301 Euclid Avenue, Cleveland 3, Ohio

The American Society for Metals is not responsible for statements or opinions printed in this publication.

Table of Contents for Vol. 54

Abrasion Resistance of Metals, by R. D. Haworth, Jr. (a)	514	Coalescence of Carbide in Steel, by N. T. Belaiew (a)	880	High-Temperature Corrosion of Stainless Steels, by W. E. Fontaine	332
A Brief History of Alloy Steel, by Carl A. Zapffe	459	Composition and Properties of the Natural Oxide Film on Aluminum, by Fred Keller and Junius D. Edwards	195	Hydrogen Absorbed by Steel From Acid, by L. S. Darken and R. P. Smith (a)	230
A Camera for Microradiography, by Gerard H. Boss (bp)	689	Cores in Die Casting, by C. R. Maxon (a)	244	Hydrogen in Aluminum, by C. E. Ransley and H. Neufeld (a)	892
A Funnel for Powdered Plastic, by Bert R. Lanker (bp)	348	Credit for July Cover (cp)	317	Impact Testing of Weldments, by William C. Long	43
Aging in Gas Turbine Alloys, by Nicholas J. Grant and Joseph R. Lane (a)	530	Crucible Furnaces for Nonferrous Melting, by Richard H. Stone (c) ..	188	Improved Silicon-Irons for Electrical Equipment, by Weston Morrill	673
Alloy Steel in Oil-Field Equipment, by R. L. Adams	468	"Current Theories of the Hardening of Steel"—50 Years Later, by J. B. Austin	201	Inclusions in Tensile Fractures of Forging Steels, by H. D. Shephard and E. A. Loria (a)	380
Alloy Steel in Oil Refineries, by F. C. Braun	471	Decarburization of Steel With Mill Scale, by W. A. Pennington (a) ..	538	Indium-Bismuth Phase Diagram, by E. A. Peretti and S. C. Carapella, Jr. (a)	522
Alloy Steel in the Turret Lathe, by Donald M. Gurney	474	Delta Ferrite and Sigma in a Heat Resisting Steel, by J. J. Gilman, P. K. Koh and Otto Zmeskal (a)	522	Industrial Metals of High Purity, by Albert Portevin (c)	69
Alloy Steel in War—Then and Now, by Clyde Williams	485	Density Variations in Some Killed Steel Ingots, by C. F. Sawyer and J. W. Spretnak (a)	380	Inert-Gas-Shielded Metal-Arc Welding, by J. S. Sohn and A. N. Kugler (a) ..	888
Alloy Steels in Railroad Service, by J. L. Carver	502	Discovery of Aluminum Brass, by R. Genders (c)	847	Influence of Low Temperatures on the Mechanical Properties of 18-8 Cr-Ni Stainless Steel, by D. J. McAdam, Jr., G. W. Geil and Frances Jane Cromwell (a)	394
Alloy Steels, the Farm Tractor, and the Full Granary, by Glen C. Riegel ..	507	Distribution of Inclusions in Some Killed Alloy Steel Ingots, by K. L. Fellers, M. M. Helzel and J. W. Spretnak (a)	374	Influence of Ni and Mo on the Isothermal Transformation of Austenite in Pure Fe-Ni and Fe-Ni-Mo Alloys With 0.55% C, by D. A. Scott, W. M. Armstrong and F. A. Forward (a)	366
Alloy Steels, the Farm Tractor, and the Full Granary, by Muir L. Frey ..	507	Drilling Very Hard Materials, by David A. Vermilyea (bp)	686	Life of Ingot Molds, by Robert Stumper (a)	238
Aluminum Spray Coating to Protect Welded Units, by Merrill A. Scheil (bp)	64	Dynamic Hot Hardness Testing (with special reference to isothermal transformations), by George M. Enos, George J. Peer and James C. Holzwarth	51	Locating Cavities in Test Disks, by Henry Thompson (bp)	347
A Mechanical Test for Detecting Longitudinal Fissures in Fine Wire, by D. W. White	837	Effect of Alloying Elements on Recrystallization, Electrical Conductivity and Rupture of Al, by R. H. Harrington (a)	384	Low Alloy Steels in the Electrical Industry, by J. T. Rettaliata	477
A Modified Punch Card Filing System for Metallurgical Literature, by J. H. Westbrook and L. H. DeWald ..	324	Effect of Orientation on Knoop Hardness of Single Crystals of Zn and Si-Ferrite, by F. W. Daniels and C. G. Dunn (a)	382	Low-Carbon Fe-Mo (a)	558
An End-Quenched Bar for Deep Hardening Steels, by Gerrit DeVries (a) ..	512	Effect of Steel "Quality", by E. M. MacCutcheon (a)	100	Low Ductility in Testing, by J. F. Baker (a)	81
An Improvement in Lead Laps, by Walter H. Bruckner (bp)	63	Effect of Vanadium on the Properties of Cast Carbon and Carbon-Molybdenum Steels, by N. A. Ziegler, W. L. Meinhart and J. R. Goldsmith (a)	392	Low-Temperature Creep of Steel, by Albert Portevin (c)	188
A Note on Good Management (cp) ..	317	Electron Diffraction of Corrosion Films, by E. A. Gulbransen (a) ..	234	Low-Temperature Impact of Annealed and Sensitized 18-8, by Erwin H. Schmidt	698
Antifriction Alloys, by J. Lacombe and M. Dannenmuller (a)	878	Electroplate on Magnesium, by William Loose (a)	228	Low-Temperature Properties of Lead-Base Solders and Soldered Joints, by R. I. Jaffee, E. J. Minarcik and B. W. Gonser	843
A Philosophy of Fracture, by N. F. Mott (a)	96	Enlarged Responsibilities of Engineers (cp)	56	Low-Temperature Properties of Solders (a)	881
Application of the Theory of Diffusion to the Formation of Alloys in Powder Metallurgy, by Pol Duwez and C. B. Jordan (a)	536	Factors Affecting Subsurface Defects in Forging-Steel Ingots, by E. A. Loria and H. D. Shephard (a) ..	378	Magnesium for Cathodic Protection, by H. A. Humble (a)	224
A Review of Magnetic Materials Especially for Communication Systems, by R. A. Chegwidden	705	Fatigue Limit of S.A.E. 1095 After Various Heat Treatments, by Arthur C. Forsyth and Roland P. Carreker ..	683	Mechanical Properties of Aircraft Alloys at Very Low Temperatures, by J. L. Zambrow and M. G. Fontana (a)	394
A Salute to Alloy Steel, by Francis B. Foley	171	Finding the Facts Brings Agreement (cp)	56	Metallurgy and Its Place in Engineering Education, by John Chipman ..	190
A Simple, Accurate Microhardness Testing Device, by E. Boerje Bergsman	183	Formation of the Natural Oxide Film on Aluminum, by Fred Keller and Junius D. Edwards	35	Microstructure and Mechanical Properties of Cast Steels, by M. F. Hawkes and B. F. Brown (a)	388
A Tilting Stage for Leveling Metallographic Specimens, by E. C. Pearson (bp)	686	Forming and Heat Treatment of Corrugated Diaphragms, by R. I. Jaffee, E. I. Beidler and R. H. Ramsey (a) ..	386	Multiple Tempering of Low-Alloy Toolsteel, by B. Z. Berman (bp) ..	64
Atmospheres for Clean Hardening and Carburizing, by Floyd E. Harris ..	337	Gaging Thin Films (a)	898	Nature and Detection of Grinding Burn in Steel, by L. P. Tarasov and C. O. Lundberg (a)	548
Atmospheres for the Heat Treatment of Steel, by Floyd E. Harris	175	Galling Tests of Graphitic and Regular Oil Hardening Die Steels, by A. F. Sprankle and R. W. Dayton ..	65	New Welding Methods Using Inert Gas (a)	886
Atomic Engines for Aircraft (a)	744	Gas in Bronzes, by W. T. Pell-Walpole (a)	220	Nickel-Base Alloys for High-Temperature Applications, by A. G. Guy (a) ..	532
Automatic Polishing of Metallographic Samples, by E. D. Holt	350	Hardening and Recrystallization in 60 Cu-20 Ni-20 Mn Alloy, by C. H. Samans, C. C. Brayton, H. L. Drake and L. Litchfield (a) ..	526	1947 Recipient, A.S.M. Medal for the Advancement of Research, by Hugh W. Wright	482
Bazooka Shells, by George B. Clark (a)	750	High Angle Guided Bombs, by L. O. Grondahl (a)	690	Notch Brittleness, by E. Orowan (a) ..	90
Beta Laminations in Cartridge Brass, by R. L. Dowdell, C. A. Nagler, M. E. Fine, H. P. Klug and G. Bit-sianes (a)	528	Highly Accurate Sand Castings (cp) ..	315	Notes at the Convention and Elsewhere, by the Editors	695
Bigger and Better Precision Castings (cp)	315	High-Purity Helium for Welding, by William A. Mays (c)	848	Oxidation of High-Temperature Alloys Containing Molybdenum, by W. C. Leslie and M. G. Fontana (a)	518
Brittle American Plate, by W. Barr (a)	102	High Speed Photographs of Water Jet in the End-Quench Test, by Robert A. Buchanan	180	Oxygen Enrichment in Converter Practice, by J. L. Harrison, W. C. Newell and A. Hartley (a)	562
Brittle Armor Plate, by D. E. J. Offord (a)	98			Pitting of Steel Parts During Barrel Tumbling, by A. L. Simmons (bp) ..	349
Brittle Ships, by J. F. Baker (a)	84				
Brittle Ship Steel, by J. L. Adam (a) ..	90				
Calibration of Testing Machines With Proving Ring, by D. H. Rowland (bp)	347				
Case Hardness "Pattern", by F. V. Horak (bp)	680				
Cause and Cure of Inverse Chill and Hard Spots in Cast Iron, by C. A. Zapffe and R. L. Phebus (a)	540				
Chromated Protein Protective Films (a)	250				

(a) Abstract; (bp) Bits and Pieces; (c) Correspondence; (cp) Critical Points; (d) Data Sheet.

Predicting the Effect of Complex Tempering Cycles, by J. L. Walsman and W. T. Snyder (a).....	372	Sprayed Metal Coatings—Their Structure, Properties and Uses, by John E. Wakefield	827	The Manganese-Zinc Phase Diagram from 0 to 50% Zn, by E. V. Potter and R. W. Huber (a)	524
Proper Frequency for Induction Heating of Nonmagnetic Metals, by J. T. Vaughan and H. B. Osborn, Jr.	46	Stability of Steels at Elevated Temperatures, by A. B. Wilder and J. O. Light (a)	534	The Metallography and Heat Treatment of 8-10% Ni Steel, by G. R. Brophy and A. J. Miller (a).....	370
Properties of Aluminum Bronzes at Subzero and High Temperatures, by Robert I. Jaffee and Robert H. Ramsey	57	Starting a Hydriyng Generator, by Paul E. Busby and Cecil C. Busby (bp)	689	The Microhardness of Carbides in Toolsteels, by L. P. Tarasov	846
Rapid Shop Test for Zinc Die Casting Alloys, by C. Goldberg (bp).....	64	Strain Gage for Testing Sheet Metal at High Temperature, by Glen Guarnieri and James Miller	692	The Microstructure of Low-Carbon Steel, by R. L. Rickett and F. C. Kristufek (a)	364
Recent Metallurgical Progress in France, by M. G. Corson (a).....	874	Stress Relief at Low Temperature, by T. W. Greene (a)	894	The Physics of Creep, by E. Orowan (a)	552
Removing Carbonate From Copper Cyanide Plating Solutions, by H. F. Ross (bp)	687	Structural Alloy Steels in the Air Age. Aircraft Engines, by Arthur W. F. Green	491	The Problems of Defense (cp)	56
Report of Atomic Energy Commission	323	Structural Alloy Steels in the Air Age. Alloy Steels in the Airplane Itself, by L. D. Bonham	495	The Stabilization of Austenitic Stainless Steel, by Samuel J. Rosenberg and John H. Darr (a)	520
Report on Atomic Power	489	Structural Changes During Continuous Cooling, by Carl A. Liedholm	849	The Super-Duper Alloys (cp)	315
Research and Development of the U. S. Air Force, by Carl Spaatz (a)	691	Structural Strength of the Welded Joint, by G. S. Mikhailapov (a).....	216	Tin-Rich Tin-Lead, by H. S. Kallish and F. J. Dunkerley (a)	884
Residual Stresses and Microstructure in Hollow Cylinders, by H. B. Wisheart and R. K. Potter (a).....	514	Subzero Treatment of Bearing Parts, by H. Habart (c)	71	Toughness, by J. Pomey (a)	874
Resistance to Sensitization of Austenitic Cr-Ni Steels of 0.03% Max. Carbon Content, by W. O. Binder, C. M. Brown and Russell Franks (a)	516	Supersonics Versus Radiography, by Herbert R. Isenburger	318	Training and Research in Atomic Energy	182
Resonant Frequency as a Means of Inspection, by Edward Epreman (bp)	64	Technical Papers for the Convention (cp)	317	Transformation and Retention of Austenite in 5140, 2340 and T1340 Steels of Comparable Hardenability, by A. R. Trolano (a).....	362
Retained Austenite (Abstract of Campbell Lecture), by Morris Cohen.....	823	Tentative Hardenability Bands, 4620H to 6150H (d)	64-B	Transformation Characteristics of Ten Selected Nickel Steels, by J. P. Sheehan, C. A. Julien and A. R. Trolano (a)	368
Roadblocks to Engineering Progress (cp)	316	Tentative Hardenability Bands, 8617H to 8641H (d)	200-B	Transformation of S.A.E. 4330 Steel During Continuous Cooling, by C. A. Liedholm and Associates (d).....	848-B
Role of Alloy Steels in the Automotive Industry, by William F. Sherman	497	Tentative Hardenability Bands, 8642H to 8742H (d)	344-B	Transformer Sheet, by G. Delbart, R. Potaszkin and M. Sage (a)	242
Search for Atomic Control Continues Season's Greetings!, by L. J. Barker (c)	848	Tentative Hardenability Bands, 8745H to 9445H (d)	488-B	Transgranular Cleavage Facets in Cast Molybdenum, by C. A. Zapffe, F. K. Landgraf and C. O. Worden	328
Selective Annealing of Copper Alloys, by O. H. C. Messner (c).....	70	Testing and Control of Spot Welds in Aluminum, by Gerard H. Boss	344	Transverse Mechanical Properties in Heat Treated Steel Products, by Cyril Wells and R. F. Mehl (a).....	512
Sheffield Comes to Pittsburgh (cp).....	317	Tests at Enlwetok on Improved Atomic Bombs	42	Typical Data for Magnetic Materials, by R. A. Chegwidzen (d)	704-B
Shifts in Interest in Nonferrous Metals (cp)	55	The Austenitic Stainless Steels—American and British Practice Compared, by F. H. Keating	819	Using Tempilstiks for Determining the Heat Losses of a Furnace, by Leo Satz (bp)	687
Short-Time High-Temperature Deformation Characteristics of Several Sheet Alloys, by James Miller and Glen Guarnieri (a)	532	The Dimensional Stability of Steel, Part IV—Toolsteels, by B. S. Lement, B. L. Averbach and M. Cohen (a)	362	Using the Scleroscope for Testing the Depth of Shallow, Hardened Cases, by B. Z. Berman (bp)	688
Sn-Pb and Ag-Cu-Zn, by V. I. Kostentetz and A. M. Ivanchenko (a).....	884	The Effect of Titanium on Nitrogen in Steel, by George F. Comstock.....	319	Versatile Vacuum-Fusion Apparatus, by Manley W. Mallett (a)	544
Solder Flow Tester for Tinplate, by J. J. Sperotto (a)	546	The Fractographic Examination of Tungsten, by C. A. Zapffe and F. K. Landgraf (a)	382	V-2 and Future Guided Missiles, by C. F. Green (a)	690
Some Industrial Uses of Nitrogen and the Rare Gases, by J. M. Crockett.....	833	The Isothermal Decomposition of Martensite and Retained Austenite, by B. L. Averbach and Morris Cohen (a)	362	Wetting Properties of Metal Powders, by Bernard Kopelman and C. C. Gregg (a)	542
Some International Progress (cp)	316	The Machinability of Free-Machining Steels, by M. Eugene Merchant and Norman Zlatin (a)	512		
Specialized Foundry Control for Composite Castings, by Arthur K. Higgins	679				

List of Authors

Adam, J. L.—Brittle Ship Steel (a).....	90	Belaiew, N. T.—Coalescence of Carbide in Steel (a)	880	Braun, F. C.—Alloy Steel in Oil Refineries	471
Adams, R. L.—Alloy Steel in Oil-Field Equipment	468	Bergsman, E. Boerje—A Simple, Accurate Microhardness Testing Device	183	Brayton, C. C., C. H. Samans, H. L. Drake and L. Litchfield—Hardening and Recrystallization in 60 Cu-20 Ni-20 Mn Alloy (a)	526
Armstrong, W. M., F. A. Forward and D. A. Scott—Influence of Ni and Mo on the Isothermal Transformation of Austenite in Pure Fe-Ni and Fe-Ni-Mo Alloys With 0.55% C (a).....	366	Berman, B. Z.—Multiple Tempering of Low-Alloy Toolsteel (bp)	64	Brophy, G. R., and A. J. Miller—The Metallography and Heat Treatment of 8-10% Ni Steel (a)	370
Austin, J. B.—“Current Theories of the Hardening of Steel”—50 Years Later	201	Using the Scleroscope for Testing the Depth of Shallow, Hardened Cases (bp)	688	Brown, B. F., and M. F. Hawkes—Microstructure and Mechanical Properties of Cast Steels (a)	388
Averbach, B. L.—The Dimensional Stability of Steel, Part IV—Toolsteels (With Morris Cohen and B. S. Lement) (a)	362	Binder, W. O., C. M. Brown and Russell Franks—Resistance to Sensitization of Austenitic Cr-Ni Steels of 0.03% Max. Carbon Content (a)	516	Brown, C. M., W. O. Binder and Russell Franks—Resistance to Sensitization of Austenitic Cr-Ni Steels of 0.03% Max. Carbon Content (a).....	516
The Isothermal Decomposition of Martensite and Retained Austenite (With Morris Cohen) (a)	362	Bitsianes, G., H. P. Klug, M. E. Fine, C. A. Nagler and R. L. Dowdell—Beta Laminations in Cartridge Brass (a)	528	Bruckner, Walter H.—An Improvement in Lead Laps (bp)	63
Baker, J. F.—Brittle Ships (a).....	84	Bonham, L. D.—Structural Alloy Steels in the Air Age. Alloy Steels in the Airplane Itself	495	Buchanan, Robert A.—High Speed Photographs of Water Jet in the End-Quench Test	189
Low Ductility in Testing (a).....	84	Boss, Gerard H.—A Camera for Micro-radiography (bp)	689	Busby, Cecil C., and Paul E. Busby—Starting a Hydriyng Generator (bp)	689
Barker, L. J.—Season's Greetings! (c)	848	Testing and Control of Spot Welds in Aluminum	344	Busby, Paul E., and Cecil C. Busby—Starting a Hydriyng Generator (bp)	689
Barr, W.—Brittle American Plate (a)	102				
Beidler, E. I., R. I. Jaffee and R. H. Ramsey—Forming and Heat Treatment of Corrugated Diaphragms (a)	386				

(a) Abstract; (bp) Bits and Pieces; (c) Correspondence; (cp) Critical Points; (d) Data Sheet.

Carapella, S. C., Jr., and E. A. Peretti—Indium-Bismuth Diagram (a) ..	522	Enos, George M., George J. Peer and James Holzwarth—Dynamic Hot Hardness Testing (with special reference to isothermal transformations) ..	51	Harris, Floyd E.—Atmospheres for Clean Hardening and Carburizing Atmospheres for the Heat Treatment of Steel ..	327
Carreker, Roland P., and Arthur C. Forsyth—Fatigue Limit of S.A.E. 1095 After Various Heat Treatments ..	683	Epreman, Edward—Resonant Frequency as a Means of Inspection (bp) ..	64	Harrison, J. L., W. C. Newell and A. Hartley—Oxygen Enrichment in Converter Practice (a) ..	562
Carver, J. L.—Alloy Steels in Railroad Service ..	502	Fetters, K. L., M. M. Helzel and J. W. Spretnak—Distribution of Inclusions in Some Killed Alloy Steel Ingots (a) ..	374	Hartley, A., J. L. Harrison and W. C. Newell—Oxygen Enrichment in Converter Practice (a) ..	562
Cheggwidden, R. A.—A Review of Magnetic Materials Especially for Communication Systems ..	705	Fine, M. E., C. A. Nagler, R. L. Dowdell, H. P. Klug and G. Bitslanes—Beta Laminations in Cartridge Brass (a) ..	528	Hawkes, M. F., and B. F. Brown—Microstructure and Mechanical Properties of Cast Steels (a) ..	388
Typical Data for Magnetic Materials (d) ..	704-B	Foley, Francis B.—A Salute to Alloy Steel ..	171	Haworth, R. D., Jr.—Abrasion Resistance of Metals (a) ..	544
Chipman, John—Metallurgy and Its Place in Engineering Education ..	190	Fontaine, W. E.—High-Temperature Corrosion of Stainless Steels ..	332	Helzel, M. M., K. L. Fetters and J. W. Spretnak—Distribution of Inclusions in Some Killed Alloy Steel Ingots (a) ..	374
Clark, George B.—Bazooka Shells (a) ..	750	Fontana, M. G.—Mechanical Properties of Aircraft Alloys at Very Low Temperatures (With J. L. Zambrow) (a) ..	394	Higgins, Arthur K.—Specialized Foundry Control for Composite Castings ..	679
Cohen, Morris—Retained Austenite (Abstract of Campbell Lecture) ..	823	Oxidation of High-Temperature Alloys Containing Molybdenum (With W. C. Leslie) (a) ..	518	Holt, E. D.—Automatic Polishing of Metallographic Samples ..	359
The Dimensional Stability of Steel, Part IV—Toolsteels (With B. S. Lement and B. L. Averbach) (a) ..	362	Forsyth, Arthur C., and Roland P. Carreker—Fatigue Limit of S.A.E. 1095 After Various Heat Treatments ..	683	Holzwarth, James C., George M. Enos and George J. Peer—Dynamic Hot Hardness Testing (with special reference to isothermal transformations) ..	51
The Isothermal Decomposition of Martensite and Retained Austenite (With B. L. Averbach) (a) ..	362	Forward, F. A., D. A. Scott and W. M. Armstrong—Influence of Ni and Mo on the Isothermal Transformation of Austenite in Pure Fe-Ni and Fe-Ni-Mo Alloys With 0.55% C (a) ..	366	Horak, F. V.—Case Hardness "Pattern" (bp) ..	686
Comstock, George F.—The Effect of Titanium on Nitrogen in Steel ..	319	Franks, Russell, C. M. Brown and W. O. Binder—Resistance to Sensitization of Austenitic Cr-Ni Steels of 0.03% Max. Carbon Content (a) ..	516	Huber, R. W., and E. V. Potter—The Manganese-Zinc Phase Diagram From 0 to 50% Zn (a) ..	521
Corson, M. G.—Recent Metallurgical Progress in France (a) ..	874	Frey, Muir L.—Alloy Steels, the Farm Tractor, and the Full Granary ..	507	Humble, H. A.—Magnesium for Cathodic Protection (a) ..	224
Critical Points ..		Geil, G. W., D. J. McAdam, Jr., and Frances Jane Cromwell—Influence of Low Temperatures on the Mechanical Properties of 18-8 Cr-Ni Stainless Steel (a) ..	394	Isenburger, Herbert R.—Supersonics Versus Radiography ..	318
A Note on Good Management ..	317	Genders, R.—Discovery of Aluminum Brass (c) ..	847	Ivanchenko, A. M., and V. I. Kostenetz—Sn-Pb and Ag-Cu-Zn (a) ..	684
Bigger and Better Precision Castings Credit for July Cover ..	317	Gilman, J. J., P. K. Koh and Otto Zmeskal—Delta Ferrite and Sigma in a Heat Resisting Steel (a) ..	522	Jaffer, Robert I.—Forming and Heat Treatment of Corrugated Diaphragms (With E. I. Beidler and Robert H. Ramsey) (a) ..	386
Enlarged Responsibilities of Engineers ..	56	Goldberg, C.—Rapid Shop Test for Zinc Die Casting Alloys ..	64	Low-Temperature Properties of Lead-Base Solders and Soldered Joints (With E. J. Minarek and B. W. Gonser) ..	843
Finding the Facts Brings Agreement ..	56	Goldsmith, J. R., W. L. Meinhardt and N. A. Ziegler—Effect of Vanadium on the Properties of Cast Carbon and Carbon-Molybdenum Steels (a) ..	392	Properties of Aluminum Bronzes at Subzero and High Temperatures (With Robert H. Ramsey) ..	57
Highly Accurate Sand Castings ..	315	Gonser, B. W., R. I. Jaffee and E. J. Minarek—Low-Temperature Properties of Lead-Base Solders and Soldered Joints ..	843	Jordan, C. B., and Pol Duwez—Application of the Theory of Diffusion to the Formation of Alloys in Powder Metallurgy (a) ..	536
Roadblocks to Engineering Progress ..	316	Grant, Nicholas J., and Joseph R. Lane—Aging in Gas Turbine Alloys (a) ..	530	Julien, C. A., A. R. Troiano and J. P. Sheehan—Transformation Characteristics of Ten Selected Nickel Steels (a) ..	368
Sheffield Comes to Pittsburgh ..	317	Green, Arthur W. F.—Structural Alloy Steels in the Air Age. Aircraft Engines ..	491	Kalish, H. S., and F. J. Dunkerley—Tin-Rich Tin-Lead (a) ..	884
Shifts in Interest in Nonferrous Metals ..	55	Green, C. F.—V-2 and Future Guided Missiles (a) ..	690	Keating, F. H.—The Austenitic Stainless Steels—American and British Practice Compared ..	819
Some International Progress ..	316	Greene, T. W.—Stress Relief at Low Temperature (a) ..	894	Keller, Fred, and Junius D. Edwards—Composition and Properties of the Natural Oxide Film on Aluminum ..	195
Technical Papers for the Convention ..	317	Gregg, C. C., and Bernard Kopelman—Wetting Properties of Metal Powders (a) ..	542	Formation of the Natural Oxide Film on Aluminum ..	35
The Problems of Defense ..	56	Grondahl, L. O.—High Angle Guided Bombs (a) ..	690	Klug, H. P., M. E. Fine, C. A. Nagler, R. L. Dowdell and G. Bitslanes—Beta Laminations in Cartridge Brass (a) ..	528
The Super-Duper Alloys ..	315	Guarnieri, Glen, and James Miller—Short-Time High-Temperature Deformation Characteristics of Several Sheet Alloys (a) ..	532	Koh, P. K., J. J. Gilman and Otto Zmeskal—Delta Ferrite and Sigma in a Heat Resisting Steel (a) ..	522
Crockett, J. M.—Some Industrial Uses of Nitrogen and the Rare Gases ..	833	Gulbransen, E. A.—Electron Diffraction of Corrosion Films (a) ..	234	Kopelman, Bernard, and C. C. Gregg—Wetting Properties of Metal Powders (a) ..	542
Cromwell, Frances Jane, G. W. Geil and D. J. McAdam, Jr.—Influence of Low Temperatures on the Mechanical Properties of 18-8 Cr-Ni Stainless Steel (a) ..	394	Gurney, Donald M.—Alloy Steel in the Turret Lathe ..	474	Kostenetz, V. I., and A. M. Ivanchenko—Sn-Pb and Ag-Cu-Zn (a) ..	884
Daniels, F. W., and C. G. Dunn—Effect of Orientation on Knoop Hardness of Single Crystals of Zn and Si-Ferrite (a) ..	382	Guy, A. G.—Nickel-Base Alloys for High-Temperature Applications (a) ..	532	Kristufek, F. C., and R. L. Rickett—The Microstructure of Low-Carbon Steel (a) ..	364
Dannenmuller, M., and J. Lacombe—Antifriction Alloys (a) ..	878	Habart, H.—Subzero Treatment of Bearing Parts (c) ..	71	Kugler, A. N., and J. S. Sohn—Inert-Gas-Shielded Metal-Arc Welding (a) ..	888
Darken, L. S., and R. P. Smith—Hydrogen Absorbed by Steel From Acid (a) ..	230	Harrington, R. H.—Effect of Alloying Elements on Recrystallization, Electrical Conductivity and Rupture of Al (a) ..	384	Lacombe, J., and M. Dannenmuller—Antifriction Alloys (a) ..	878
Darr, John H., and Samuel J. Rosenberg—The Stabilization of Austenitic Stainless Steel (a) ..	520			Landgraf, F. K.—The Fractographic Examination of Tungsten (With C. A. Zapffe) (a) ..	382
Dayton, R. W., and A. F. Sprankle—Galling Tests of Graphitic and Regular Oil Hardening Die Steels ..	65			Transgranular Cleavage Facets in Cast Molybdenum (With C. A. Zapffe and C. O. Worden) ..	328
Delbart, G., R. Potaszkin and M. Sage—Transformer Sheet (a) ..	242				
DeVries, Gerrit—An End-Quenched Bar for Deep Hardening Steels (a) ..	512				
DeWald, L. H., and J. H. Westbrook—A Modified Punch Card Filing System for Metallurgical Literature ..	324				
Dowdell, R. L., C. A. Nagler, M. E. Fine, H. P. Klug and G. Bitslanes—Beta Laminations in Cartridge Brass (a) ..	528				
Drake, H. L., C. C. Brayton, C. H. Samans and L. Litchfield—Hardening and Recrystallization in 60 Cu-20 Ni-20 Mn Alloy (a) ..	526				
Dunkerley, F. J., and H. S. Kalish—Tin-Rich Tin-Lead (a) ..	884				
Dunn, C. G., and F. W. Daniels—Effect of Orientation on Knoop Hardness of Single Crystals of Zn and Si-Ferrite (a) ..	382				
Duwez, Pol, and C. B. Jordan—Application of the Theory of Diffusion to the Formation of Alloys in Powder Metallurgy (a) ..	536				
Edwards, Junius D., and Fred Keller—Composition and Properties of the Natural Film on Aluminum ..	195				
Formation of the Natural Oxide Film on Aluminum ..	35				

(a) Abstract; (bp) Bits and Pieces; (c) Correspondence; (cp) Critical Points; (d) Data Sheet.

Lane, Joseph R., and Nicholas J. Grant—Aging in Gas Turbine Alloys (a)	530	Pearson, E. C.—A Tilting Stage for Leveling Metallographic Specimens (bp)	686	Snyder, W. T., and J. L. Waisman—Predicting the Effect of Complex Tempering Cycles (a)	372
Lanker, Bert R.—A Funnel for Powdered Plastic (bp)	348	Peer, George J., James C. Holzwarth and George M. Enos—Dynamic Hot Hardness Testing (with special reference to isothermal transformations)	51	Sohn, J. S., and A. N. Kugler—Inert-Gas-Shielded Metal-Arc Welding (a)	888
Lement, B. S., B. L. Averbach and M. Cohen—The Dimensional Stability of Steel, Part IV—Toolsteels (a)	362	Pell-Walpole, W. T.—Gas in Bronzes (a)	220	Spaatz, Carl—Research and Development by the U. S. Air Force (a)	691
Leslie, W. C., and M. G. Fontana—Oxidation of High-Temperature Alloys Containing Molybdenum (a) ..	518	Pennington, W. A.—Decarburization of Steel With Mill Scale (a)	538	Sperotto, J. J.—Solder Flow Tester for Tinplate (a)	546
Liedholm, Carl A.—Structural Changes During Continuous Cooling	849	Peretti, E. A., and S. C. Carapella, Jr.—Indium-Bismuth Phase Diagram (a)	522	Sprinkle, A. F., and H. W. Dayton—Galling Tests of Graphitic and Regular Oil Hardening Die Steels	65
Transformation of S.A.E. 4330 Steel During Continuous Cooling (With Associates) (d)	848-B	Phebus, R. L., and C. A. Zapffe—Cause and Cure of Inverse Chill and Hard Spots in Cast Iron (a) ..	540	Spretnak, J. W.—Density Variations in Some Killed Steel Ingots (With C. F. Sawyer) (a)	380
Light, J. O., and A. B. Wilder—Stability of Steels at Elevated Temperatures (a)	534	Pillia, F. J.—Inert-Gas-Shielded-Arc Spot Welding (a)	890	Distribution of Inclusions in Some Killed Alloy Steel Ingots (With M. M. Helzel and K. L. Fellers) (a) ..	374
Litchfield, L., H. L. Drake, C. C. Brayton, and C. H. Samans—Hardening and Recrystallization in 60 Cu-20 Ni-20 Mn Alloy (a)	526	Pomey, J.—Toughness (a)	874	Stone, Richard H.—Crucible Furnaces for Nonferrous Melting (c)	188
Long, William C.—Impact Testing of Weldments	43	Portevin, Albert—Industrial Metals of High Purity (c)	69	Stumper, Robert—Life of Ingot Molds (a)	238
Loose, William—Electroplate on Magnesium (a)	228	Low-Temperature Creep of Steel (c) ..	188	Tarasov, L. P.—Nature and Detection of Grinding Burn in Steel (With C. O. Lundberg) (a)	548
Loria, E. A., and H. D. Shephard—Factors Affecting Subsurface Defects in Forging-Steel Ingots (a) ..	378	Potaszkis, R., G. Delbart and M. Sage—Transformer Sheet (a)	242	The Microhardness of Carbides in Toolsteels	846
Inclusions in Tensile Fractures of Forging Steels (a)	380	Potter, E. V., and R. W. Huber—The Manganese-Zinc Phase Diagram From 0 to 50% Zn (a)	524	Thompson, Henry—Locating Cavities in Test Disks (bp)	347
Lundberg, C. O., and L. P. Tarasov—Nature and Detection of Grinding Burn in Steel (a)	548	Potter, R. K., and H. B. Wishart—Residual Stresses and Microstructure in Hollow Cylinders (a)	514	Trolano, A. R.—Transformation and Retention of Austenite in 5140, 2340 and T1340 Steels of Comparable Hardenability (a)	362
MacCutcheon, E. M.—Effect of Steel "Quality" (a)	100	Ramsey, Robert H.—Forming and Heat Treatment of Corrugated Diaphragms (With E. I. Beldler and Robert I. Jaffee) (a)	386	Transformation Characteristics of Ten Selected Nickel Steels (With J. P. Sheehan and C. A. Julien) (a) ..	368
Mallett, Manley W.—Versatile Vacuum-Fusion Apparatus (a)	544	Properties of Aluminum Bronzes at Subzero and High Temperatures (With Robert I. Jaffee)	57	Vaughan, J. T., and H. B. Osborn, Jr.—Proper Frequency for Induction Heating of Nonmagnetic Metals ..	46
Maxon, C. R.—Cores in Die Casting (a)	244	Ransley, C. E., and H. Neufeld—Hydrogen in Aluminum (a)	892	Vermilyea, David A.—Drilling Very Hard Materials (bp)	686
Mays, William A.—High-Purity Helium for Welding (c)	848	Retalliat, J. T.—Low Alloy Steels in the Electrical Industry	477	Waisman, J. L., and W. T. Snyder—Predicting the Effect of Complex Tempering Cycles (a)	372
McAdam, D. J., Jr., G. W. Geil and Frances Jane Cromwell—Influence of Low Temperatures on the Mechanical Properties of 18-8 Cr-Ni Stainless Steel (a)	394	Rickett, R. L., and F. C. Kristufek—The Microstructure of Low-Carbon Steel (a)	364	Wakefield, John E.—Sprayed Metal Coatings—Their Structure, Properties and Uses	827
Mehl, R. F., and Cyril Wells—Transverse Mechanical Properties in Heat Treated Steel Products (a)	512	Riegel, Glen C.—Alloy Steels, the Farm Tractor, and the Full Granary	507	Wells, Cyril, and R. F. Mehl—Transverse Mechanical Properties in Heat Treated Steel Products (a)	512
Meinhart, W. L., N. A. Ziegler and J. R. Goldsmith—Effect of Vanadium on the Properties of Cast Carbon and Carbon-Molybdenum Steels (a) ..	392	Rosenberg, Samuel J., and John H. Darr—The Stabilization of Austenitic Stainless Steel (a)	520	Westbrook, J. H., and L. H. DeWald—A Modified Punch Card Filing System for Metallurgical Literature ..	324
Merchant, M. Eugene, and Norman Zlatin—The Machinability of Free-Machining Steels (a)	512	Ross, H. F.—Removing Carbonate From Copper Cyanide Plating Solutions (bp)	687	White, D. W.—A Mechanical Test for Detecting Longitudinal Fissures in Fine Wire	837
Messner, O. H. C.—Selective Annealing of Copper Alloys (c)	70	Rowland, D. H.—Calibration of Testing Machines With Proving Ring (bp)	347	Wilder, A. B., and J. O. Light—Stability of Steels at Elevated Temperatures (a)	534
Mikhailapov, G. S.—Structural Strength of the Welded Joint (a)	216	Sage, M., G. Delbart and R. Potaszkis—Transformer Sheet (a)	242	Williams, Clyde—Alloy Steel in War—Then and Now	485
Miller, A. J., and G. R. Brophy—The Metallography and Heat Treatment of 8-10% Ni Steel (a)	370	Samans, C. H., C. C. Brayton, H. L. Drake and L. Litchfield—Hardening and Recrystallization in 60 Cu-20 Ni-20 Mn Alloy (a)	526	Wishart, H. B., and R. K. Potter—Residual Stresses and Microstructure in Hollow Cylinders (a)	514
Miller, James, and Glen Guarnieri—Short-Time High-Temperature Deformation Characteristics of Several Sheet Alloys (a)	532	Satz, Leo—Using Tempilstiks for Determining the Heat Losses of a Furnace (bp)	687	Worden, C. O., F. K. Landgraf and C. A. Zapffe—Transgranular Cleavage Facets in Cast Molybdenum	328
Strain Gage for Testing Sheet Metal at High Temperature	692	Sawyer, C. F., and J. W. Spretnak—Density Variations in Some Killed Steel Ingots (a)	380	Wright, Hugh W.—1947 Recipient, A.S.M. Medal for the Advancement of Research	482
Minarek, E. J., B. W. Gonser and R. I. Jaffee—Low-Temperature Properties of Lead-Base Solders and Soldered Joints	843	Schmidt, Erwin H.—Low-Temperature Impact of Annealed and Sensitized 18-8	698	Zambrow, J. L., and M. G. Fontana—Mechanical Properties of Aircraft Alloys at Very Low Temperatures (a) ..	394
Morrill, Weston—Improved Silicon-Irons for Electrical Equipment ..	675	Scott, D. A., W. M. Armstrong and F. A. Forward—Influence of Ni and Mo on the Isothermal Transformation of Austenite in Pure Fe-Ni and Fe-Ni-Mo Alloys With 0.55% C (a) ..	366	Zapffe, C. A.—A Brief History of Alloy Steel	459
Mott, N. F.—A Philosophy of Fracture (a)	96	Sheehan, J. P., C. A. Julien and A. R. Trolano—Transformation Characteristics of Ten Selected Nickel Steels (a)	368	Cause and Cure of Inverse Chill and Hard Spots in Cast Iron (With R. L. Phebus) (a)	540
Nagler, C. A., R. L. Dowdell, M. E. Fine, H. P. Klug and G. Bitslanes—Beta Laminations in Cartridge Brass (a)	528	Shephard, H. D., and E. A. Loria—Factors Affecting Subsurface Defects in Forging-Steel Ingots (a) ..	378	The Fractographic Examination of Tungsten (With F. K. Landgraf) (a)	382
Neufeld, H., and C. E. Ransley—Hydrogen in Aluminum (a)	892	Inclusions in Tensile Fractures of Forging Steels (a)	380	Transgranular Cleavage Facets in Cast Molybdenum (With F. K. Landgraf and C. O. Worden) ..	328
Newell, W. C., A. Hartley and J. L. Harrison—Oxygen Enrichment in Converter Practice (a)	562	Sherman, William F.—Role of Alloy Steels in the Automotive Industry ..	497	Ziegler, N. A., W. L. Meinhart and J. R. Goldsmith—Effect of Vanadium on the Properties of Cast Carbon and Carbon-Molybdenum Steels (a) ..	392
Offord, D. E. J.—Brittle Armor Plate (a)	98	Simmons, A. L.—Pitting of Steel Parts During Barrel Tumbling (bp)	349	Zlatin, Norman, and M. Eugene Merchant—The Machinability of Free-Machining Steels (a)	512
Orowan, E.—Notch Brittleness (a) ..	90	Smith, R. P., and L. S. Darken—Hydrogen Absorbed by Steel From Acid (a)	230	Zmeskal, Otto, P. K. Koh and J. J. Gilman—Delta Ferrite and Sigma in a Heat Resisting Steel (a)	522
Osborn, H. B., Jr., and J. T. Vaughan—Proper Frequency for Induction Heating of Nonmagnetic Metals	46				

(a) Abstract; (bp) Bits and Pieces; (c) Correspondence; (cp) Critical Points; (d) Data Sheet.



**It takes more than
"SAY-SO" to make a
"Brale" Diamond Indenter**

• As sole manufacturer of the genuine "ROCKWELL" Hardness Tester and originator of the universally accepted ROCKWELL Hardness scales, Wilson holds a deep responsibility. Every product bearing a Wilson name *must* have accuracy that approaches perfection. And "BRALE" is a Wilson name.

Remember, an inaccurate hardness test is worse than no test at all as it will pass defective material and reject good material. All the accuracy in your "ROCKWELL" Hardness Tester is lost if inferior penetrators are used. Keep in mind that one point of hardness on the Rockwell Scale represents a depth of only 0.00008".

WILSON

MECHANICAL INSTRUMENT CO., INC.
AN ASSOCIATE COMPANY OF AMERICAN CHAIN & CABLE COMPANY, INC.

230-F Park Avenue, New York 17, N. Y.

ACCO



**ACCURATE, ON-THE-SPOT HARDNESS
TESTING DIRECTLY IN ROCKWELL SCALES**



Ames
PORTABLE
HARDNESS TESTER

Testing steel shoe shanks
using portable bench stand at
Keystone Shoe & Shank Co.

THIS large shoe shank maker is finding the Ames Hardness Tester, held in bench stand, to be ideal for testing thousands of shanks. Many other uses have been found for this newest of all Rockwell Hardness testers. If you are testing round, flat and irregular shaped parts for hardness, write for catalog and information.

AMES PRECISION MACHINE WORKS
WALTHAM 54, MASS. U. S. A.



**CONTINUOUS CLEAN HARDENING
IN A RECIPROCATING FULL MUFFLE FURNACE**

VERSATILE. Adaptable to a countless variety of work from needles to large forgings. These furnaces may be used for hardening, annealing, normalizing, etc.
SIMPLE. Simply-designed mechanism is out of the heat while the muffle remains in the furnace at all times. Work is in constant motion and so cannot stick to the hearth.
ATMOSPHERE CONTROL. A full muffle is utilized, making it possible to maintain a definite atmosphere around the work. This widens the range of usefulness to include clean hardening, carburizing, and "Ni-Carbing".



Made in five different sizes
with capacities from 10 to
1200 lbs. per hour.

WRITE US TODAY

American Gas Furnace Co.

1002 Lafayette Street

Elizabeth 4, N. J.